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Glass Solutions

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ASTM GLASS STANDARDS FOR GENERAL CONTRACTORS

The purpose of this document is to manage the expectations of glass defects according to ASTM (American Society for Testing & Materials).

Within the luxury market, expectations are high, and this document will help inform parties on tolerances of error in terms of glass defects.

When Is A Defect Not A Defect?

In short, if facing the glass at 90 degrees in daylight, but not direct sunlight, at 10 feet, inspect the central 80% of the glass panel. If defects are not visible to the naked eye, then, according to ASTM, the glass is defect free.

Visual Inspection Visual Aid

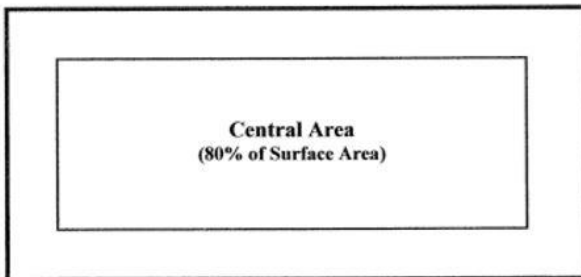
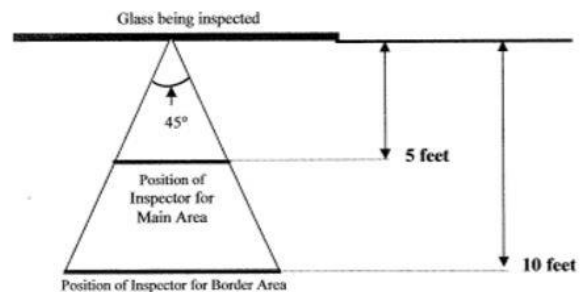
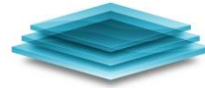


Diagram 2



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ASTM Official Standards for Imperfections in Glass

ASTM International is the basis for understanding glass and coating quality, allowable defects, and visual inspection criteria. ASTM has many different specifications and classifications depending on the type of glass being analyzed or quality controlled.

[ASTM C 1036-16 \(Standard specification for flat glass\) Q3 / Glazing select specifications](#)

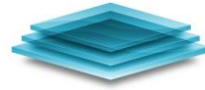
Understanding ASTM inspection criteria is very important as it outlines inspection distance, lighting requirements, inspection times, etc.

We've included a brief summary in this article of key parts of the ASTM. Keep in mind there are different types of defects with different inspection rules.

The previously mentioned 10-foot rule is a general guideline but isn't definitive. For example, on sealed units of 35 sq. ft., the glass can have three 1" scratches and still be considered within standards. Even if the scratches are visible.

Examples of Visual Inspection Criteria

- Glass shall be inspected in the central area in transmission at a distance of 5 feet from the observer, and in reflection at a distance of 10 feet from the observer.
- Glass shall be inspected in the border area in transmission and reflection at a distance of 10 feet from the observer.
- Glass must be inspected using a viewing angle of 90 degrees from the glass with suitable background light (daylight without direct sunlight or a range of 500 – 1000 foot lamberts.) If a lighting box is used as a light source, the diffusing plate shall be parallel to and at a distance of 10 ft from the glass.
- Inspection should not exceed viewing of more than 5 seconds for lites up to 6 square feet, 10 seconds for lites up to 35 sq ft, and 20 seconds for lites larger than 35 square feet, either in transmission or reflection.
- If defects are visible beyond what is allowable as listed by sizes (square feet) below using the inspection criteria, the glass may be rejected.



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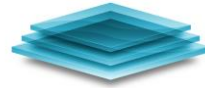
Allowable Defects

a) Single lites up to 6 square feet

- Scratches – Viewable as stated above must be 1” or less. No more than 1 is allowed per lite.
- Debris, Dirt, Spots – Viewable as stated above, must be 1/16” or less. No more than 1 is allowed per lite.
- Seeds, Bubbles, Knots, Stones – Viewable as stated above, must be 1/16” or less. No more than 1 is allowed per lite.
- No more than 1 total viewable defect as described above is allowed per lite.
- Shells – No more than ¼” from edge less than ½ the thickness of the lite. No more than 1 per side.
- Chips – No more than 1/8” from the edge. No more than 1 per side. (see illustration for chips on page x.)
- Coating – Must be uniform on the lite inspected when viewed in transmission using the inspection criteria previously stated above.
- The border area is comprised of 2 inches plus ½” from each edge of the lite. All other area is the central area.

b) Single lites 6 to 35 square feet

- Scratches – Viewable as stated above must be 1” or less. No more than 2 are allowed per lite and must be separated by a minimum of 24 inches.
- Debris, Dirt, Spots – Viewable as stated above, must be 1/16” or less. No more than 2 are allowed per lite and must be separated by a minimum of 24 inches.
- Seeds, Bubbles, Knots, Stones – Viewable as stated above, must be 1/16” or less. No more than 2 are allowed per lite and must be separated by a minimum of 24 inches.
- No more than 2 total viewable defects as described above are allowed per lite.
- Shells – No more than ¼” from edge less than ½ the thickness of the lite. No more than 1 per side.
- Chips – No more than 1/8” from the edge. No more than 1 per side. (see illustration for chips.)



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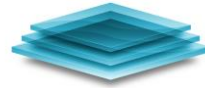
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- Coating – Must be uniform on the lite inspected when viewed in transmission using the inspection criteria previously stated above.
 - The border area is comprised of 4 inches plus ½” from each edge of the lite. All other area is the central area (see illustration.)
- c) Single lites over 35 square feet**
- Scratches – Viewable as stated above, must be 1” or less. No more than 3 are allowed per lite and must be separated by a minimum of 24 inches.
 - Debris, Dirt, Spots – Viewable as stated above, must be 1/16” or less. No more than 3 are allowed per lite and must be separated by a minimum of 24 inches.
 - Seeds, Bubbles, Knots, Stones – Viewable as stated above, must be 1/16” or less. No more than 3 are allowed per lite and must be separated by a minimum of 24 inches.
 - No more than 3 total viewable defects as described above are allowed per lite.
 - Shells – No more than ¼” from edge less than ½ the thickness of the lite. No more than 1 per side.
 - Chips – No more than 1/8” from the edge. No more than 1 per side. (see illustration for chips.)
 - Coating – Must be uniform on the lite inspected when viewed in transmission using the inspection criteria previously stated above.
 - The border area is comprised of 6 inches plus ½” from each edge of the lite. All other area is the central area (see illustration)

Allowable Defects Visual Aid

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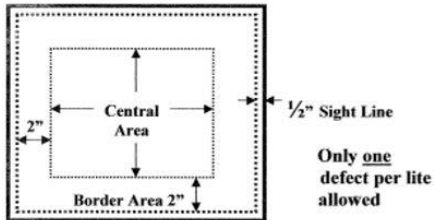
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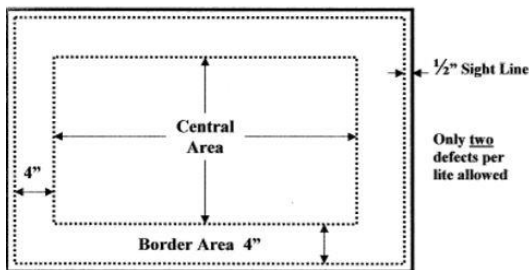
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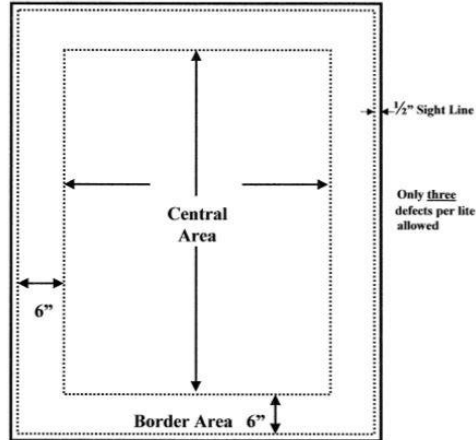
Lites up to 6 square feet



Lites 6 to 35 square feet

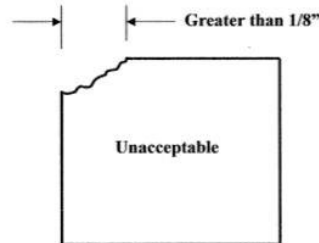
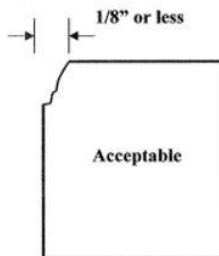


Lites greater than 35 square feet

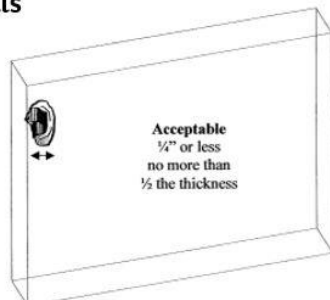


Understanding Glass Chips and Shells

Glass Chips

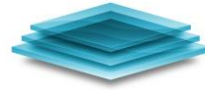


Glass Shells



LED Edge Lit Glass Visual Aid

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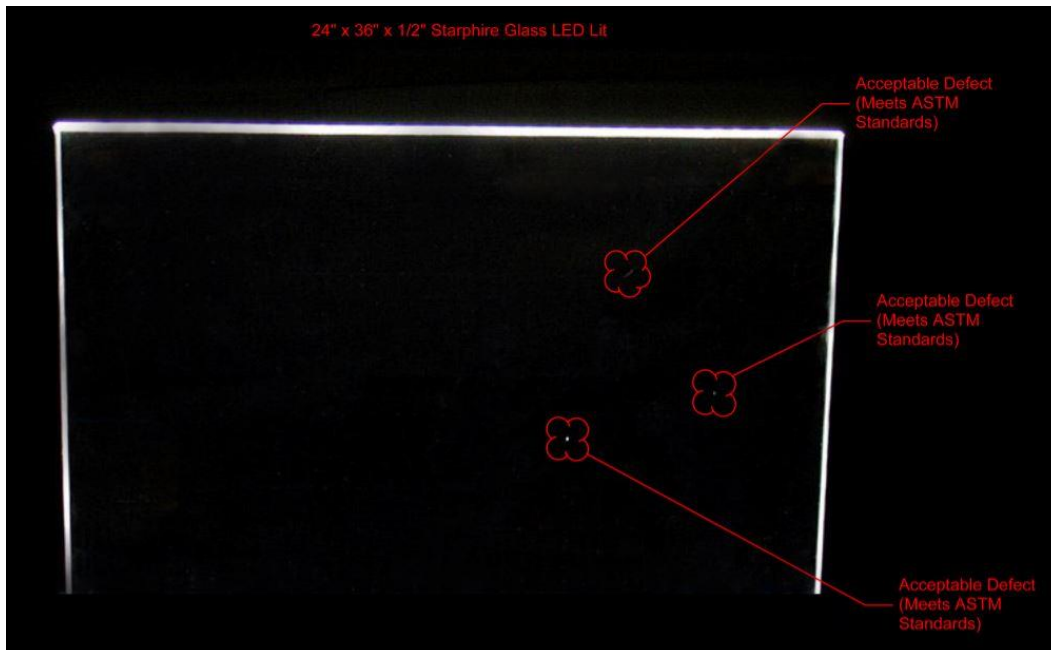
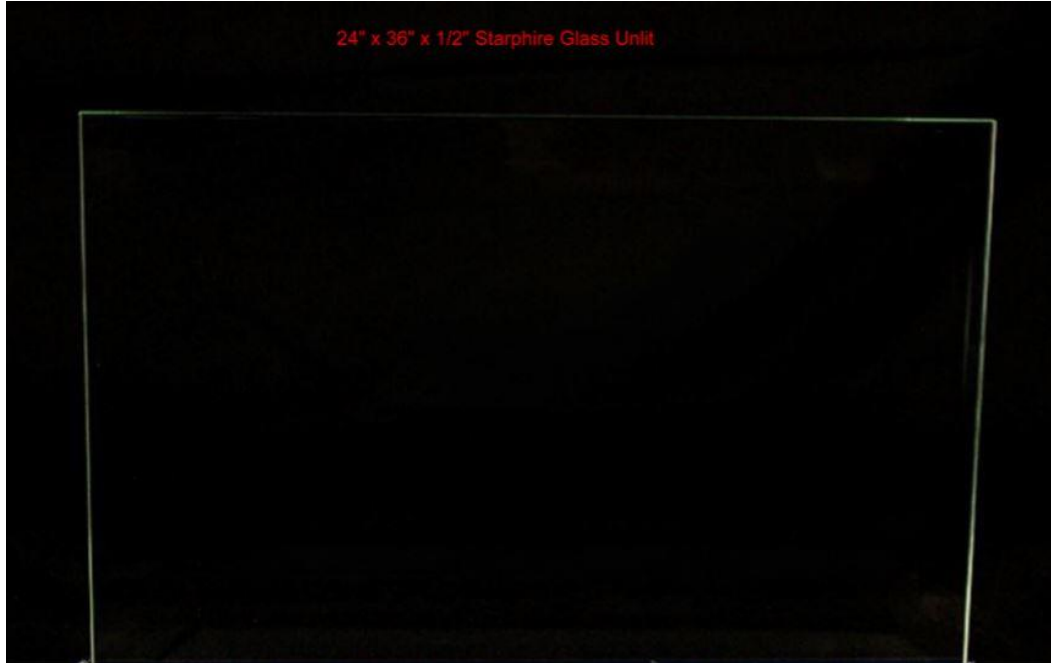
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